

Chapter 7

Health and the Environment

Threats from environmental hazards are not new to the military. To some extent they have always existed in the work place and other areas of operation. They may be man-made or occur naturally and may pose a health threat to personnel. Historically, military preventive medicine personnel have focused on reducing or eliminating the risks of food-, water-, waste-, insect-, and rodent-borne illnesses, occupational and environmental injuries, and heat and cold injuries. Recent deployments, however, have demonstrated the need to reduce risks from occupational and environmental exposures to toxic chemicals from industrial facilities, discarded HM, and common military chemical compounds. This chapter focuses on the impact environmental conditions have on the health of service members, rather than how actions taken by service members impact on the environment.

BACKGROUND

7-1. The medical disciplines that are concerned with preventing disease and injury and maintaining service members health include:

- Preventive medicine (including environmental sciences and sanitary engineering).
- Veterinary services.
- Medical laboratory services.
- Medical NBC defense.

Specialists in these disciplines provide commanders and leaders with advice and develop programs to provide the techniques and procedures that can protect service members from environmental hazards. These actions conserve combat power and sustainment resources. The command surgeon and/or supporting medical activity or command identify the potential hazards, assess the risks, and recommend courses of action to the commander. Commanders must decide how they will use this advice and ensure their units take preventive measures. Medical personnel provide ongoing support by:

- Monitoring the area of operations (AO) to determine whether the hazards have changed.
- Identifying new hazards.
- Ensuring that personnel are applying the command-directed countermeasures.

7-2. Commanders must ensure that they remain abreast of health hazard changes in the operational environment. Medical personnel support this responsibility by recommending medical threat considerations for inclusion as CCIRs during the IPB process. At the national level, the Armed Forces Medical Intelligence Center (AFMIC) produces medical intelligence regarding operations in foreign areas.

CONCEPT OF OPERATIONS

7-3. Medical personnel obtain background information about the AO to identify health hazards, assess health risks, develop courses of action, and advise commanders of the risks. They provide the commanders/leaders with critical information on the risks from identified health hazards. They then assess these risks, and provide commanders/leaders with recommended protective/preventive measures for consideration as part of the overall operational risk management program. Medical personnel continue to monitor the AO for changes in the level of risk or the identifications of new hazards. When they detect increases in their risk levels or identify new health hazards, medical personnel update databases and provide commanders/leaders with the new information guidance regarding protective and preventive measures. See DOD Directive (DODD) 6490.2, Joint Medical Surveillance; DOD Instructions (DODI) 6490.3, Implementation and Application of Joint Medical Surveillance for Deployments; and 6055.1, DOD Safety and Occupational Health (SOH) Program; AR 40-3, Medical, Dental, and Veterinary Care; AR 40-5, Preventive Medicine; and AR 40-216, Neuropsychiatry and Mental Health; for information about preventive medicine measures and policies.

7-4. Baseline health status is recorded in the individual health record for all personnel when they enter military service and, at time of deployment, a field health record is established. Following exposure to hazardous agents or materials, individuals receive appropriate medical follow-up, and their health records are updated. Health records are maintained for the term of service/employment. See DODD 6490.2 and AR 40-66, Medical Record Administration and Health Care Documentation.

ENVIRONMENTAL AND OCCUPATIONAL HEALTH HAZARDS

7-5. Environmental and occupational health hazards can be classified by the methods of occurrence or origin and include:

- Occupational. Occupational health hazards occur in the duty area and are caused by specific activities such as exposure to HM (i.e., spraying CARC paint without use of respiratory protection), or

dispensing fuels without proper gloves and eye protection. Exposure may result when HM is used or produced in the duty area, or it may be the result of accidental HM spillage. Exposure is typically restricted to those personnel directly involved in the activity or located closely to the activity site. Typical countermeasures include substituting a less hazardous material for a more hazardous material; improving ventilation at the duty site to reduce hazardous pollutant levels; requiring personnel to use appropriate PPE such as respiratory protection or safety glasses; or discontinuing the operation until proper procedures can be used.

NOTE: Each chemical has a MSDS provided by the manufacturer to the user that lists the characteristics of the chemicals and other information needed to use the chemicals safely.

For information on protective/preventive measures, see FM 8-10-7, Health Service Support in a Nuclear Biological and Chemical Environment; FM 8-10-17, Preventive Medicine Services; FM 8-500, Hazardous Materials Injuries, FM 21-10, Field Hygiene and Sanitation; and FM 21-10-1, Unit Field Sanitation Team.

- Environmental. Environmental hazards are present in the environment (from either naturally occurring or man-made sources) prior to the arrival of US forces. They include endemic insect- or rodent-borne diseases, such as malaria or dengue fever; polluted air, water, or soil from local industrial, agricultural, or mining operations; and climatic and topographic hazards such as extreme heat, cold, or altitude. Environmental hazards may also arise from these sources during the time forces are deployed in an area and military personnel must respond appropriately. For example, if an insect infestation is found in the bivouac area, it may be necessary to use pesticides to eliminate the infestation. Preventive medicine personnel executing the pest management program would be required to apply the appropriate amount of pesticide in safe manner to ensure that service members are not inadvertently exposed to the pesticide. For protective/preventive measures see FM 8-33, Control of Communicable Disease Manual; FM 8-10-17, FM 8-10-18, Veterinary Services - Tactics, Techniques, and Procedures; FM 21-10, and FM 21-10-1.
- Directed (imposed). Imposed health hazards comprise those used by an adversary against US Forces. These hazards include traditional threats such as NBC warfare agents, as well as toxic industrial materials that are released into the atmosphere by enemy forces, terrorists, or belligerents to cause injury or death. For information on protective/preventive measures see FM 8-9/NAVMED P-5059/AFJMAN 44-151, NATO Handbook on the Medical Aspects of NBC Defensive Operations, AMED P-6 (B); FM 8-284/NAVMED P-5042/AFMAN (I) 44-156/MCRP 4-11.1C, Treatment of Biological Warfare Agent Casualties; FM 8-285/NAVMED P-5041/AFJMAN 44-149/FMFM 11-11, Treatment of Chemical Agent Casualties and

Conventional Military Chemical Injuries; FM 8-10-7, FM 8-10-17, FM 21-10, and FM 21-10-1.

RISK MANAGEMENT

7-6. Effective risk management always begins with the collection of baseline information and threat reports. Using available data, commanders, with the assistance of the surgeon, review and identify the hazards within the AO and assess the risks from these hazards in accordance with risk management guidance. The level of risk is based upon an assessment of the level or severity of the hazard and the probability of occurrence. The effects of available countermeasures upon the threat are incorporated into the assessment. Command policies and directives establish acceptable risk levels. For risk management guidance, see Chapter 2 of this manual and FM 100-14, Risk Management. For example, during Operation Desert Storm, commanders had to determine what effect the emissions from the burning oil wells had on the accomplishment of the mission and the risk posed to the health of their soldiers. Limited health effect studies were conducted during the Persian Gulf War with more extensive studies beginning in May 1991.

"The concentrations of VOCs (volatile organic compounds), PAHs (polycyclic aromatic hydrocarbons), metals, and criteria pollutants in the Gulf region were much lower than initially presumed, considering the magnitude of the fires. The measurements of the mean concentrations of these pollutants are consistent across studies. The maximum concentrations due to the oil well fire emissions measured in the Gulf region are comparable to levels found in suburban locations in the US, lower than those found in large urban centers in the US, and much lower than the US-recommended occupational levels...Particulate matter, however was found to be extremely high at all monitoring sites compared with values in the US."

Dalia M. Spektor
A Review of the Scientific Literature As It Pertains to Gulf War Illnesses,
Volume 6:Oil Well Fires
National Defense Research Institute
RAND 1998

CONTROL AND COUNTERMEASURES

7-7. Controls and countermeasures may include reconnaissance to determine/confirm the quantity, quality, or confirmation of the hazard/threat; employment avoidance techniques, providing protective materials/equipment to personnel; providing decontamination capabilities for exposed personnel; and publishing treatment protocols and provisioning medical treatment personnel with appropriate medications, antidotes, and antitoxins

7-8. When deciding whether or not to employ controls/countermeasures, the commander must consider the impact that these measures will have on the health of personnel, the operation, and logistics support. The commander must make risk acceptance decisions based upon the analyses.

Controls/countermeasures are then applied, based upon the commander's decisions.

7-9. Limitations and uncertainties impact on application of controls and countermeasures. Leaders must consider operational requirements and METT-TC trade-offs as part of applying controls and countermeasures

SURVEILLANCE

7-10. Medical surveillance is the routine, standardized tracking of disease and injury rates, occupational and environmental exposures, and countermeasure usage and effectiveness. Medical surveillance is incomplete until these results are reported to commanders and decision-makers for use in the overall command operational risk management effort. For specific policy on medical surveillance, see DODD 6490.2 and DODI 6490.3.

7-11. Forward positioned medical units are limited in their medical surveillance capabilities but can provide vital information, such as reporting disease and non-battle injury (DNBI) cases. More robust medical elements supporting in a reachback or technical chain manner perform more sophisticated medical surveillance and analysis on the information provided. At higher echelons, the medical capabilities and medical surveillance capabilities also increase. See DODD 6490.2 and AR 40-5.

7-12. Regardless of the source of medical surveillance, important health incidents or findings are recorded and reported. Within the operational area, the command surgeon and preventive medicine staff advise the commander of significant surveillance results. As the reports are transmitted to higher headquarters, they are consolidated and reported to the next higher headquarters. When the reports reach the repository agency (i.e., US Army Center for Health Promotion and Preventive Medicine for DNBI reports) they are entered into the appropriate database. Statistical rates and reports are then produced that are used to update assessments and policies and to develop technical guides and doctrine for future operations. Commanders and leaders should have access to this information to evaluate the health of their force and to establish preventive/protective guidelines for countering medical threats and maintaining the health of their command.

ADVICE TO THE COMMANDER ON ACCEPTANCE OF RISK

7-13. Medical personnel provide advice to the commander on possible outcomes from acceptance of risk. The advice provides details on the level of risk, protective/preventive measures, and the potential consequences when these measures are not applied. For example, a unit moved into a field site to conduct operations. Preventive medicine personnel conducted a survey of the area and found that the soil in a small area was contaminated with a toxic industrial chemical. The commander was advised to select an alternate location for occupancy or only use areas of the site that were contamination free by restricting access to hazardous areas. The commander opted to use the recommended portion to establish operations but permitted one platoon to setup their billeting immediately adjacent to the contaminated area. After a few days, several personnel reported on sick call with severe skin irritation

from exposure to the toxic material; some personnel required hospitalization for treatment. Had the commander enforced the recommended preventive measures, these personnel would have been available for duty rather than receiving treatment. Ultimately the commander's decisions regarding the use of medical advice will impact on the health of the force and on accomplishment of the mission.

SUMMARY

7-14. To accomplish the mission of the US armed forces, it is essential that military forces remain healthy and fit. Environmental and occupational health hazards must be identified and measures taken to mitigate their effects on the health of military personnel. Through command-sponsored preventive medicine programs and continual surveillance of emerging hazards, the commander can be better advised to more accurately assess the risks to unit readiness.